

# What different types of assessment are there?

Two categories of assessment need to be considered for students at Key Stages 3 and 4. Both formative assessment and summative assessment are required in the classroom, but serve two different purposes. Summative assessment is familiar to teachers as unit tests or public examinations. It takes place after the learning phase and is used to quantify achievement. On the other hand, formative assessment is a continual process, whose purpose is not to quantify, but to influence improvement. This is familiar to teachers in various forms such as peer assessment, marking of drafts, and questioning. It incorporates some type of feedback provided for the student. If actioned, the feedback should afford improvement in the student's understanding or output.

It is possible to use summative assessment to assess skills and knowledge. Marking a worksheet showing the completion of different sorting algorithms or a multiple-choice test of terminology are valid ways of testing knowledge. Checking the use of formulas in a spreadsheet or the accuracy of a flowchart are valid ways of testing skills. Summative assessment of artefacts can only report on outcomes, not on the processes employed to reach those outcomes.

The processes used to produce many of the outcomes in computing are referred to as computational thinking. Computational thinking concepts include decomposition, abstraction, algorithmic thinking, generalisation, and evaluation. Pattern recognition is also often viewed as a component of computational thinking within the classification of generalisation. The outcomes produced by learners may not directly afford an opportunity to assess the use of these particular thinking skills. For example, a learner designs an algorithm to change a bicycle tyre. The steps are ordered correctly to provide a solution. Based on the artefact presented, it is tempting to attribute the computational thinking process of decomposition (steps), algorithm design (ordered), and evaluation (works) to the learner. However, the decomposition (steps) could have been provided by the teacher and the evaluation (works) could have been determined by a peer. The ability to assess

computational thinking is intrinsically tied to the techniques used in the classroom. In this particular instance, only the algorithm design (ordered) is verifiably the learner's own behaviour. This is why it is more challenging to assess the thinking than it is to assess skills and knowledge.

In reality, assessing computational thinking could be incorporated into the formative assessment stage. Shifting the focus from the endpoint to the development provides opportunities for learners to demonstrate their use of computational thinking skills such as decomposition and abstraction. Providing a range of different problem contexts gives opportunities for learners to demonstrate generalisation of problem solutions. Helping a learner debug a program gives teachers opportunities to observe the use of evaluation and algorithm design. Questioning gives learners the opportunity to demonstrate their analytic skills and gives teachers the opportunity to observe the use of a variety of computational thinking skills. In these ways, assessing computational thinking may be accomplished in situations where formative assessment is being used.

In terms of assessment, there are several needs that require balancing: the need for summative assessments to provide data; the need for formative assessments to afford progression; and the need for assessing knowledge, skills, and computational thinking as required in the programme of study. By focusing on the use of formative assessment during learning, it is possible for teachers to observe the use of computational thinking skills without having to infer their use from the characteristics of an artefact. In that way, formative assessment becomes just as valuable for the teacher as for the learner. Summative assessment, when required, then validates the good foundations of formative assessment.

The recording of learning outcomes is done in recognition of the importance in monitoring progression over a sustained period of time. In order to effectively record progression in computing, the computational thinking concepts used by the students and the classroom techniques used by the teacher to facilitate learning require periodic auditing.